

REMARKS

Claims 1-8, 10-12, 17-21 and 23-36 are currently pending in the present application. Claims 13, 15-16 and 22 have been canceled without prejudice and without acquiescence. Claims 1, 3, 5, 10-12, 17, 18-21, 25, and 27-31 have been amended without prejudice and without acquiescence. Claims 32-36 have also been added. Support for the amendments and new claims can be found throughout the specification and the original claims, more specifically, p. 8, lns. 11-16, p. 5-6 the bridging paragraph (claim 1); pg. 5, ln. 3 (claim 4); p. 7, lns. 6-21 (claim 7); pg. 6, lns. 3-5 (claim 10); pg. 17, lns. 32-34 (claim 17); p. 5, lns. 17-20, p. 6, ln 18 and pg. 8, lns. 14-16, pg. 11, lns 6-8 (claim 34); pg. 6, ln. 17 (claim 35); and pg. 6, lns. 18-20 (claim 36). Applicants retain the right to file a continuation application on any canceled subject matter. No new matter has been added.

The issues outstanding in this application are as follows:

- Claim 10 was rejected under 35 U.S.C. § 112, second paragraph for being allegedly indefinite.
- Claims 10-12, 17-21 28 and 29 were rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Chang et al. 1999.
- Claims 10-12, 17-19 and 21 were rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Dekker et al. 1991.
- Claims 10, 11, 17-19, 28, 29 and 30 were rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by Komvopoulos (US 6685743).
- Claims 10, 11, 27-29 and 31 were rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by Anders et al. (US 6022553).
- Claims 1, 5, 7, 8, 15 and 16 were rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by Sheppard et al. (US 6143247).
- Claims 1-4, 6, 10, 13, 17, 22 and 24-26 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Sheppard et al. in view Komvopoulos et al., Dekker et al., and Anders et al.

Applicants respectfully traverse the outstanding rejections, and Applicants respectfully request reconsideration and withdrawal thereof in light of the amendments and remarks contained herein.

I. 35 U.S.C. 112, second paragraph

Claims 1 and 10 were rejected by the Examiner under 35 U.S.C. 112, second paragraph as being indefinite. Applicants respectfully traverse.

In order to advance prosecution of the application, Applicants have amended claims 1 and claim 10 without prejudice and without acquiescence to clarify the claims. In light of these amendments, Applicants respectfully request that the rejection be withdrawn.

II. 35 U.S.C 102

A. Chang et al.

Claims 10-12, 17-21, 28, and 29 were rejected by the Examiner under 35 U.S.C. 102(b) as being anticipated by Chang et al. (Art. Cells, Blood Subs., and Immob. Biotech., 27(3), 229-244, 1999). Applicants respectfully traverse this rejection and request reconsideration and withdrawal thereof in light of the following remarks.

Anticipation of a claim is only established where “each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegel Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed.Cir. 1987).

In order to advance the prosecution of the present application, Applicants have amended independent claims 10 and 17 without prejudice and without acquiescence to more clearly define the invention. Amended claims 10 and 17 relate to a substrate surface comprising a channel having a depth of $\leq 1000 \mu\text{m}$ to serve as a liquid transportation system and an immediate water-contact angle of $\leq 30^\circ$. Applicants assert that Chang et al. does not teach a surface comprising a channel having a depth of $\leq 1000 \mu\text{m}$. Thus, in view of the amendment, Applicants respectfully request that the rejection be withdrawn.

B. Dekker et al.

Claims 10-12, 17-19, and 21 were rejected by the Examiner under 35 U.S.C. 102(b) as being anticipated by Dekker et al. (Biomaterials 12: 130-138, 1991). Applicants respectfully traverse this rejection and request reconsideration and withdrawal thereof in light of the following remarks.

Anticipation of a claim is only established where “each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed.Cir. 1987).

In order to advance the prosecution of the present application, Applicants have amended independent claims 10 and 17 without prejudice and without acquiescence to more clearly define the invention. Amended claims 10 and 17 relate to a substrate surface comprising a channel having a depth of $\leq 1000 \mu\text{m}$ to serve as a liquid transportation system and an immediate water-contact angle of $\leq 30^\circ$. Applicants assert that Dekker et al. does not teach a surface comprising a channel having a depth of $\leq 1000 \mu\text{m}$. Thus, in view of the amendment, Applicants respectfully request that the rejection be withdrawn.

C. Komvopoulos et al.

Claims 10, 11, 17-19, 28, 29 and 30 were rejected by the Examiner under 35 U.S.C. 102(e) as being anticipated by Komvopoulos et al. (US 6685743). Applicants respectfully traverse this rejection and request reconsideration and withdrawal thereof in light of the following remarks.

Anticipation of a claim is only established where “each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed.Cir. 1987).

In order to advance the prosecution of the present application, Applicants have amended independent claims 10 and 17 without prejudice and without acquiescence to more clearly define the invention. Amended claims 10 and 17 relate to a substrate surface

comprising a channel having a depth of $\leq 1000 \mu\text{m}$ to serve as a liquid transportation system and an immediate water-contact angle of $\leq 30^\circ$. Applicants assert that Kimvopoulos et al. does not teach a surface comprising a channel having a depth of $\leq 1000 \mu\text{m}$. Thus, in view of the amendment, Applicants respectfully request that the rejection be withdrawn.

D. Anders et al.

Claims 10, 11, 27-29 and 31 were rejected by the Examiner under 35 U.S.C. 102(e) as being anticipated by Anders et al. (US 6022553). Applicants respectfully traverse this rejection and request reconsideration and withdrawal thereof in light of the following remarks.

Anticipation of a claim is only established where “each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegel Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed.Cir. 1987).

In order to advance the prosecution of the present application, Applicants has amended independent claim 10 without prejudice and without acquiescence to more clearly define the invention. Amended claim 10 relates to a substrate surface comprising a channel having a depth of $\leq 1000 \mu\text{m}$ to serve as a liquid transportation system and an immediate water-contact angle of $\leq 30^\circ$. Applicants assert that Anders et al. does not teach a surface comprising a channel having a depth of $\leq 1000 \mu\text{m}$. Thus, in view of the amendment, Applicants respectfully request that the rejection be withdrawn.

E. Sheppard et al.

Claims 1, 5, 7, 8, 15 and 16 were rejected by the Examiner under 35 U.S.C. 102(e) as being anticipated by Sheppard et al. (US 6143247). Applicants respectfully traverse this rejection and request reconsideration and withdrawal thereof in light of the following remarks.

Anticipation of a claim is only established where “each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.”

Verdegal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed.Cir. 1987).

In order to advance the prosecution of the present application, Applicants have canceled claims 15 and 16 without prejudice and without acquiescence and amended claim 1 without prejudice and without acquiescence to more clearly define the invention.

Turning to the office action, it appears that the Examiner has relied upon col. 16, lns. 1-15 and col. 17, lns. 55-68 of Sheppard to teach surface modification by chemical treatment. There are only very general statements regarding gas plasma treatments. Applicants assert that Sheppard does not teach nor does it inherently teach treating a substrate surface with a gas plasma having an intensity such that after treatment the surface has a permanently decreased immediate water-contact angle. Sheppard provides no guidance for permanently decreasing the immediate water-contact angle of the surface of the substrate. Applicants remind the Examiner that inherency may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient to establish inherency. *See Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1269, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991). Inherent anticipation requires that the missing descriptive material is "necessarily present," not merely probably or possibly present, in the prior art. *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999). Inherency does not embrace probabilities or possibilities. *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1951 (Fed. Cir. 1999).

The lack of inherency is also supported by the fact that at the time when the present invention was conceived, the common knowledge for treatment of plastic surfaces with non-polymerisable gas plasma was that the hydrophilized surfaces obtained were not stable, neither during washing nor during storage. See our specification page 1, line 23 to page 2, line 14. Sheppard refers to gas plasma treatments as known technology. Thus Sheppard refers to non-permanently hydrophilized plastic surfaces which in turn means that there is no inherency for permanently decreased water contact angles in the statements of Sheppard.

Thus, in view of the amendment and argument, Applicants respectfully request that the rejection be withdrawn.

III. 35 U.S.C. 103

Claims 1-4, 6, 10, 13, 17, 22 and 24-26 were rejected by the Examiner under 35 U.S.C. 103(a) as being unpatentable over by Sheppard et al. (US 6143247), in view of Komvopoulos et al., Dekker et al., and Anders et al. Applicants respectfully traverse this rejection and request reconsideration and withdrawal thereof in light of the following remarks.

In order to advance the prosecution of the present application, Applicants have amended independent claims 1, 10 and 17 without prejudice and without acquiescence to more clearly define the invention. Each of claims 1, 10 and 17 relate to a substrate surface comprising a channel having a depth of $\leq 1000 \mu\text{m}$ to serve as a liquid transportation system and a permanently decreased immediate water-contact angle.

Applicants assert that the main reference Sheppard may generally suggest using plasma to alter a substrate surface area, however, its does not provide any guidance for permanently decreasing the immediate water-contact angle of the surface of the substrate, for example, it does not provide an indication of the plasma intensity nor does it indicate the immediate water-contact angle after treatment with the gas plasma. There is no indication whatsoever to the quality of the gas plasma hydrophilized surface required for liquid transportation in a microchannel according to objects of the present invention. Since Sheppard does not provide any goals or guidance for gas plasma treatment, Applicants assert that it fails to provide an expectation of success. As indicated in the present application on pages 2, lines 31-35 through page 3, lines 1-2 and page 7, lines 31-35, Applicants indicate that plasma hydrophillization of a substrate surface to alter the immediate water-contact angle of the surface depend upon several plasma variables, such as gas, gas flow, intensity, voltage etc as well as other factors, such as the reactor used, the position of the substrate within the reactor, kind of plastic material etc. Thus, Sheppard, may provide a very general suggestion, however, Applicants assert that Sheppard does not provide a reasonable expectation of success to result in the product or process of the pending claims. In view of this evidence, Sheppard does not meet the guidelines set forth to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 (MPEP § 2143.3) which necessitates the disclosure of the source for either a suggestion or motivation to modify a reference to produce the present invention, and a reasonable expectation of success of producing the present invention. *See In re Vaeck*, 947

F.2d 488, 20 USPQ2d 1438, (Fed. Cir. 1991).

The Examiner has combined Sheppard with Komvopoulos, Dekker and Anders to provide an expectation of success. Applicants assert that it is unlikely that one of skill in the art would combine Komvopoulos, Dekker and Anders with Sheppard to obtain the present invention. Firstly, Komvopoulos, Dekker and Anders are drawn to implantable medical devices, such as stents, and do not suggest a device comprising a channel having a depth of $\leq 1000 \mu\text{m}$ that is used for liquid transportation. Thus, one of skill in the art would not view these references as containing the appropriate parameters to result in liquid transportation in a channel having a depth of $\leq 1000 \mu\text{m}$. Thus, Applicants assert that these references to provide an expectation of success that is lacking in Sheppard, and thus the Examiner has not established a proper *prima facie* case of obviousness.

Still further, the combination of Dekker and Anders is further unlikely since the intent of Anders is to produce a medical device to reduce adhesion of cells, such as microbes. This is the opposite of Dekker which teaches plasma treatment of stents to enhance adhesion of cells, such as endothelial cells and serum proteins. Thus, the plasma treatment conditions of these two references produce opposite effects, and thus one of skill in the art would combine these references together nor combine them with Sheppard to produce the claimed invention.

In view of the above criteria, Applicants assert that the Examiner has not established a *prima facie* case of obviousness to reject the claims under 35 U.S.C. § 103 in light of the above criteria, and respectfully request that the rejection be withdrawn.

CONCLUSION

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 06-2375, under Order No. 10108311 from which the undersigned is authorized to draw.

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Respectfully submitted,

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